

# STATE OF COLORADO

## COLORADO DEPARTMENT OF HEALTH

*Dedicated to protecting and improving the health and environment of the people of Colorado*

4300 Cherry Creek Dr. S. Laboratory Building  
Denver, Colorado 80222-1530 4210 E. 11th Avenue  
Phone (303) 692-2000 Denver, Colorado 80220-3716  
(303) 691-4700



000044876



Roy Romer  
Governor

Patricia A. Nolan, MD, MPH  
Executive Director

April 25, 1994

48313

Mr. Richard J. Schassburger  
U.S. Department of Energy  
Rocky Flats Office, Bldg 116  
P.O. Box 928  
Golden, Colorado 80402-0928

**RE: Comments - Draft Treatability Study Work Plan for the Bioremediation of Chlorinated Solvents at the Rocky Flats Plant March 1994**

Dear Mr. Schassburger,

The Colorado Department of Health, Hazardous Materials and Waste Management Division (the Division), has reviewed the above referenced document submitted by DOE and prime operating contractor, EG&G. The Division's comments are attached.

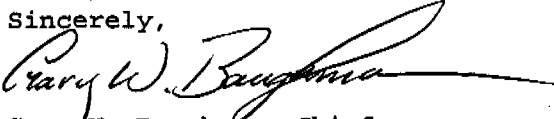
The Division finds the general scope and experimental approach presented in this workplan to be appropriate. However, as detailed in the attached comments, sections of this workplan are incomplete and difficult to follow. Based on discussions with you staff, the Division believes that these comments can be readily incorporated into this document and will not impact the underlying experimental design.

Therefore, the Division approves this work plan under the condition that all Division comments are adequately addressed and a final workplan submitted to the Division within 30 days. The Division recognizes the need to proceed expeditiously on this treatability study in support of the Corrective Measures Study/ Feasibility Study (CMS/FS) currently underway at Operable Unit 2 (OU-2). Therefore, the Division encourages the initiation of this workplan concurrent with final workplan revision and submittal.

It is not necessary to resubmit the entire workplan to the Division,- individual pages or sections may be submitted at DOE's discretion.

If you have any questions, please call Jeff Swanson of my staff at 692-3416.

Sincerely,

  
Gary W. Baughman, Chief  
Facilities Section  
Hazardous Waste Control Program

cc: Martin Hestmark, EPA  
Norma Castaneda, DOE  
Mike Harris, DOE  
~~Olga Erlich~~, EG&G  
Steve Tarlton, CDH-OE

**ADMIN RECORD**

BZ-A-00155

Verified 1/2

Colorado Department of Health  
Hazardous Materials and Waste Management Division

Treatability Study Work Plan for the  
Biodegradation of Chlorinated Solvents

Comments

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GENERAL COMMENTS:

Scope of Study and Relation to OU-2 and Sitewide Treatability Study Program (TSP) - This study is being conducted under the umbrella of the sitewide treatability study program because it has potential for application at several Ous at RFP. It will also be used to directly support the feasibility study currently being conducted at OU-2. The relationship of this study to both the OU-2 CMS/FS and the TSP should be briefly acknowledged in the introductory section of this work plan. The needs of the OU-2 CMS/FS and other OUs can and will influence decisions made during the course of this study. For example, the selection of chlorinated solvents as the focus of this initial screening and the choice of IHSS 110 as the sampling location were both likely to have been at least partially influenced by the need to support the OU-2 FS. The Division recommends that the introduction to this work plan be revised to clearly state all such influences.

Workplan Organization - The current organization of this workplan is difficult to follow. The Division recommend that the workplan be reorganized to follow the treatability study work plan organization suggested in EPA's Guide for Conducting Treatability Studies Under CERCLA.

Relationship between Experiments and Study Objectives - The relationship between the overall study objectives, phase I and phase II objectives, and experimental design are unclear to the Division from reviewing this workplan. The objectives of each experimental task should be clearly presented in the workplan, along with how experimental data is connected to the objectives, and the criteria to be used to judge success for the task. The Division recommends these relationships be clearly presented for each experimental task and study objective in the work plan.

Colorado Department of Health  
Hazardous Materials and Waste Management Division

Treatability Study Work Plan for the  
Biodegradation of Chlorinated Solvents

Comments

---

**SPECIFIC COMMENTS:**

**Section 1 Project Description**

Title of Document - The title on the cover of this work plan is inconsistent with the sub-title to section 1 and does not accurately reflect the scope and intent of the project. This is a treatability study, is not a feasibility study. However, this study will provide information to support the OU 2 feasibility study. The sub-title on the top of section 1 appears to be an accurate description of this project. The Division recommends its use on the cover page as the title of this work plan.

Project Description - There are several pieces of information of regulatory interest to the Division that should be discussed in the project description section of this work plan. These include:

1) Where will this study be conducted?

On site in Bldg 881 at RFP.

2) What is the scope of the study?

Remedy Screening at Bench Scale (test uses Laboratory Scale in latter sections.) Are bench scale and laboratory scale equivalent?

3) How does this study relate to the Operable Units and the Sitewide Treatability Study Program?

This study is part of the Sitewide Treatability Study Program and in direct support of the OU-2 CMS/FS.

4) How much waste will be treated and does it meet the treatability study exclusion under RCRA/CHWA?

Approximately 11 gallons of environmental medial, some of which could contain listed hazardous waste. Regardless of whether all soils used are hazardous waste, this study appears to meet the 1000 kg exclusion for treatability studies.

How will solvent mixtures be addressed - The project description states that the scope of this study is to address the biodegradation of solvent mixtures. However, it is the Divisions understanding that solvent mixtures are not directly investigated. Techniques for modeling solvent mixtures from pure component results are not discussed in this workplan. Is the investigation of solvent mixtures to be conducted in a future phase of this study? Will modeling be used to extrapolate the results of the study to mixtures? The Division recommends that this section be clarified with regard to how biodegradation of solvent mixtures is to be addressed in this study.

**Section 2 Site Description**

"Potential Primary Contaminants at the Various Operable Units" PPC Document - The Division does not believe that the conclusions interjected into this section regarding relative ranking or importance of environmental contamination at Rocky Flats Plant is either necessary or appropriate. These statements should be deleted from this workplan. The Division staff have not had the opportunity to review or comment on the PPC document. Therefore, the Division must defer judgement on the appropriateness and applicability of the PPC Document to making treatability study decisions. A copy of this document should be forwarded to the Division for review and comment. Additionally, this document must be added to the reference list at the end of this work plan.

Colorado Department of Health  
Hazardous Materials and Waste Management Division

Treatability Study Work Plan for the  
Biodegradation of Chlorinated Solvents

Comments

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Selection of Initial Study Scope - This section suggests several bioremediation options are potentially viable to address both chlorinated solvent and nitrate contamination at the plant. The rationale and criteria used for selection of chlorinated solvents at OU-2 as the initial scope of this project is unclear. A discussion should be added to this section stating the rationale and criteria for scoping this study. Time and budget constraints alone are not sufficient justification for project scoping. The need to support the OU-2 FS influenced the project scoping and should be stated in this section.

**Section 3 Treatment Technology Description**

Section Organization - The Division recommends that the discussion of project scope and objectives be separated from the discussion of bioremediation technology. As stated in our general comment, the Division recommends that the workplan be reorganized to generally follow the organization suggested in Table 7 of EPA's Guide for Conducting Treatability Studies Under CERCLA.

Phase I Objectives - The Division does not consider analytical equipment preparation and testing to be a valid objective. Analytical equipment preparation and testing is a task to be completed under phase I of the study. This should be clarified in the workplan.

Acetone - The Division questions the need and usefulness of evaluating the biodegradation of acetone. Acetone is highly volatile, rapidly degrades, and was not determined to be a contaminant at either OU 1 or OU 2. The Division recommends that acetone be removed from the target solvents for this study.

**Section 4 Experimental Phases**

Experimental Design - The discussion of the experimental phases to be conducted during this investigation is confusing and difficult to follow. The Division is unclear from reviewing this section what experiments are being conducted during each phase of the study, on which soils and why. This discussion should be expanded and organized into general tasks. Also, a discussion of the critical parameters to be investigated and data to be collected during each experimental task should be added to this discussion. For example, the following tasks could be used for phase 1 of this study:

Phase 1, Task 1: Laboratory Analytical Methods Development,  
Phase 1, Task 2: Phase 1 Soil Sample Collection and Preparation,  
Phase 1, Task 3: Abiotic Flask Test Sample Preparation,  
Phase 1, Task 4: Abiotic Flask Test Sampling.

Sample Analytical Methods - It is not clear to the Division why analytical methods are being developed under this workplan. The laboratory methods development task discussion should clearly define what methods are being developed and why. The discussion of sampling equipment and standard analytical methods should be moved to the Sampling and Analysis discussion in Section 6 of the Workplan.

Flask Tests - This section states that soils will be spiked with solvent mixtures during this phase of the study. No information is provided regarding how many tests will be conducted, what solvents will be added and in what mixtures. The Division requests that additional information be added to this section regarding the matrix of solvent mixtures to be evaluated in phase I of this study.

Colorado Department of Health  
Hazardous Materials and Waste Management Division

Treatability Study Work Plan for the  
Biodegradation of Chlorinated Solvents

Comments

---

Phase I Data Collection - The Division believes that the fate of chlorinated solvents in an abiotic environment are well understood and documented in the literature (substitution and elimination reactions, sometimes combined under the general name hydrolysis). A discussion of abiotic transformations that are expected to occur during the flask tests, including reaction kinetics, and degradation products when available should be included in this section of the workplan. This information will be critical to evaluation of both phase I and II experimental data.

The Division requests additional information be added to this section regarding exactly what data will be collected during phase I, why it is necessary, and how the data will be utilized to meet the study objectives. This should include information of the value added to this study by collecting headspace samples in addition to soil samples.

Phase II Culture Growth - Additional information should be provided regarding how culture growth will be monitored and what criteria will be used to judge stability of the population for each of the four populations.

Initial Solvent Experiments - The workplan states that, "The concentration of solvents to be tested will vary depending on the results of initial experiments in different solvent ranges." The Division requests clarification to what initial experiments this statement refers.

Phase III and Future Work - It is the Divisions understanding that Phase III and future work will be evaluated and scoped based on the results of the phase I and II experimental work. Discussions of phase III and future work should be limited to the background scoping and study objectives discussions. Discussion of future, yet to be scoped, work in the experimental design section of the work plan is not necessary. This discussion should be moved to the project scope discussion.

#### Section 6 Sampling and Analysis Plan

Sample Introduction Techniques - This discussion is incomplete and confusing. The experimental design presented in section 3 and 4 discusses both purge-and-trap and headspace analysis as analytical techniques using a GC/MS (EPA method 8260) for this study. The Division has been informed that the headspace analysis to be conducted in this study is not EPA's sample introduction technique (Method 5020 Headspace), but that headspace from the samples will be collected using a purge-and-trap technique. Also, the QAA in Appendix B states that a GC will be used to measure oxygen and carbon dioxide concentrations and a GC/MS to identify the contaminants and their breakdown gaseous products and metabolic intermediates. No information is provided in the sampling and analysis plan on how this data will be collected. The Division requests that additional information be included in this section of the workplan regarding all analytical methods to be utilized in this study.

Analytical Methods Development - The Division requests clarification as to what analytical methods are being developed during phase I of this study, why they are necessary, and how these methods relate to the treatability study objectives.

Off Site Lab to Analyze Microbes - The QAA in Appendix B raises a question regarding the usefulness of having an off-site laboratory analyze soil from this study for microbial screening to determine which functional groups are present. It is critical to the success of a study that these types of questions be answered before the study is conducted. The Division recommends that a thorough review of the need and usefulness of this data be conducted to determine if this data is needed to meet the study objectives. The QAA should then be modified to reflect this review.

Colorado Department of Health  
Hazardous Materials and Waste Management Division

Treatability Study Work Plan for the  
Biodegradation of Chlorinated Solvents

Comments

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Section 8 Data Analysis and Interpretation

Reference to EPA Guidance - This paragraph states that data from this study will be presented and interpreted in accordance with section 3.12 of EPA's Guide for Conducting Treatability Studies under CERCLA. Section 3.12 of the guidance is titled Reporting the Results and discusses how to organize a treatability report, not data analysis. The Division does not consider this section of guidance an appropriate reference for how to analyze and interpret the results of this study.

This section should not be limited to presenting broad generic statements of what the phase I and phase II experimental data will be used to evaluate. A discussions of how the data will be analyzed and how the analysis related to the study objectives should be included in this section.